AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method for detecting a position of a mobile robot, the method comprising:

calculating time taken for each ultrasonic signal generated by a plurality of ultrasonic signal ~~generated means~~ oscillating units of a charging station to reach the mobile robot, the ultrasound signal being generated based on ~~on the basis of~~ a point of time at which a radio frequency (RF) signal is emitted from the mobile robot ~~is emitted, and~~;

calculating a distance between the charging station and the mobile robot based on the calculated reaching time; and

calculating an angle between the charging station and the mobile robot based on the calculated distance value and a preset distance value between the plurality of ultrasonic signal oscillating ~~means~~units,

wherein the RF signal is emitted at preset time intervals such that the ultrasound signal is generated at the preset time intervals.

2. (Currently Amended) The method of claim 1, wherein the angle between the charging station and the mobile robot is calculated through triangulation based on the calculated distance value and the preset distance value between the plurality of ultrasonic signal oscillating ~~means~~units.

3. (Canceled)

4. (Currently Amended) The method of claim 1, further comprising prestoring a position number for discriminating a position of at least one ultrasonic ~~means~~ reception unit for receiving the ultrasonic signals, in order to detect a direction that the mobile robot proceeds.

5. (Original) The method of claim 1, further comprising adding a semidiameter of the mobile robot to the distance value between the charging station and the mobile robot.

6. (Original) The method of claim 1, wherein the distance value between the charging station and the mobile robot is detected through expression S=340[m/sec] x (T1-T2), wherein 340[m/sec] is sound velocity, T1 is time taken to receive an ultrasonic signal, and T2 is time taken to oscillate an ultrasonic signal after receiving an RF signal.

7. (Canceled).

8. (Currently Amended) An apparatus for detecting a position of a mobile robot, the apparatus comprising:

an RF generating ~~means~~ unit installed at a mobile robot and ~~for emitting~~configured to emit an RF(Radio Frequency) signal;

an RF reception ~~means~~ unit installed at a charging station and ~~for receiving~~configured to receive the RF signal emitted by the RF generating ~~means~~unit;

a plurality of ultrasonic signal oscillating ~~means~~ units each installed at the charging station and for oscillating ultrasonic signals based on a point of time at which a radio frequency (RF) signal is emitted;

a control ~~means for controlling~~ unit configured to control the ultrasonic signal oscillating ~~means~~ units so that the ultrasonic signals are oscillated whenever the RF signal is received by the RF reception ~~means~~unit;

ultrasonic signal reception ~~means~~ unit installed on an outer circumferential surface of the mobile robot and ~~for receiving~~configured to receive the ultrasonic signals oscillated by the plurality of ultrasonic signal oscillating ~~means~~units; and

a microcomputer installed in the mobile robot and ~~for calculating~~configured to calculate a distance and an angle between the mobile robot and the charging station based on reaching time taken for each ultrasonic signals to reach the mobile robot and a preset distance value between the plurality of ultrasonic signals oscillating ~~means~~units,

wherein the RF signal is emitted at preset time intervals such that the ultrasound signal is being generated at the preset time intervals.

9. (Currently Amended) The apparatus of claim 8, wherein the microcomputer compensates a position error of the mobile robot ~~by checking~~based on the position of the mobile robot ~~based on~~estimated from the calculated distance value and angle value.

10. (Currently Amended) The apparatus of claim 8, wherein the plurality of ultrasonic signal oscillating ~~means~~ units are installed to be symmetric to each other in a horizontal direction of the charging station.

11. (Currently Amended) The apparatus of claim 8, wherein the plurality of ultrasonic signal oscillating ~~means~~ units are installed to be symmetric to each other in vertical and horizontal directions at the charging station.

12. (Currently Amended) The apparatus of claim 8, wherein the microcomputer detects a reaching time taken for each ultrasonic signal to be received by one or more ultrasonic signal reception ~~means~~ unit after being oscillated by the plurality of ultrasonic signal oscillating ~~means~~ units on the basis of a point of time at which ~~an~~ the RF signal~~, which is generated at preset time intervals,~~ is generated; calculates a distance between the mobile robot and the charging station based on the detected reaching time; and calculates an angle between the mobile robot and the charging station through triangulation based on the detected reaching time and the preset distance value between the plurality of ultrasonic signal oscillating ~~means~~units.

13. (Currently Amended) The apparatus of claim 8, wherein the microcomputer further comprises a storing ~~means for storing~~unit configured to store position numbers for discriminating positions of the ultrasonic signal reception ~~means~~unit, and detects a direction that the mobile robot proceeds through the position number of the ultrasonic signal reception ~~means~~ unit which has received the ultrasonic signal.

14. (Currently Amended) The apparatus of claim 8, wherein when the ultrasonic signals are received by two or more ultrasonic reception ~~means~~unit, the microcomputer calculates a reaching

time taken for each ultrasonic signal to be received by the two or more ultrasonic signal reception ~~means~~unit; selects two ultrasonic signal reception ~~means~~ unit which have received ultrasonic signals whose reaching time is the fastest, among the calculated reaching time values; and calculates a distance between the mobile robot and the charging station based on the reaching time of the ultrasonic signals which have been received by the two selected ultrasonic signal reception ~~means~~unit.

15. (Original) The apparatus of claim 8, wherein the microcomputer detects the distance between the charging station and the mobile robot through expression S=340[m/sec] x (T1-T2), wherein 340[m/sec] is sound velocity, T1 is time taken to receive an ultrasonic signal, and T2 is time taken to oscillate an ultrasonic signal after receiving an RF signal.

16. (New) A method for detecting a position of a mobile robot, the method comprising:

calculating time taken for each ultrasonic signal generated by a plurality of ultrasonic signal oscillating units of a charging station to reach the mobile robot, the ultrasound signal being generated based on a point of time at which a radio frequency (RF) signal is emitted from the mobile robot;

calculating a distance between the charging station and the mobile robot based on the calculated reaching time;

calculating an angle between the charging station and the mobile robot based on the calculated distance value and a preset distance value between the plurality of ultrasonic signal oscillating units; and

prestoring a position number for discriminating a position of at least one ultrasonic reception unit for receiving the ultrasonic signals, in order to detect a direction that the mobile robot proceeds.

17. (New) An apparatus for detecting a position of a mobile robot, the apparatus comprising:

an RF generating unit installed at a mobile robot and configured to emit an RF(Radio Frequency) signal;

an RF reception unit installed at a charging station and configured to receive the RF signal

emitted by the RF generating unit;

a plurality of ultrasonic signal oscillating units each installed at the charging station and for oscillating ultrasonic signals;

a control unit configured to control the ultrasonic signal oscillating units so that the ultrasonic signals are oscillated whenever the RF signal is received by the RF reception unit;

ultrasonic signal reception unit installed on an outer circumferential surface of the mobile robot and configured to receive the ultrasonic signals oscillated by the plurality of ultrasonic signal oscillating units; and

a microcomputer installed in the mobile robot and configured to calculate a distance and an angle between the mobile robot and the charging station based on reaching time taken for each ultrasonic signals to reach the mobile robot and a preset distance value between the plurality of ultrasonic signals oscillating units,

wherein the microcomputer further comprises a storing unit configured to store position numbers for discriminating positions of the ultrasonic signal reception unit, and detects a direction that the mobile robot proceeds through the position number of the ultrasonic signal reception unit which has received the ultrasonic signal.

18. (New) An apparatus for detecting a position of a mobile robot, the apparatus comprising:

an RF generating unit installed at a mobile robot and configured to emit an RF(Radio Frequency) signal;

an RF reception unit installed at a charging station and configured to receive the RF signal emitted by the RF generating unit;

a plurality of ultrasonic signal oscillating units each installed at the charging station and for oscillating ultrasonic signals;

a control unit configured to control the ultrasonic signal oscillating units so that the ultrasonic signals are oscillated whenever the RF signal is received by the RF reception unit;

ultrasonic signal reception unit installed on an outer circumferential surface of the mobile robot and configured to receive the ultrasonic signals oscillated by the plurality of ultrasonic signal oscillating units; and

a microcomputer installed in the mobile robot and configured to calculate a distance and an angle between the mobile robot and the charging station based on reaching time taken for each ultrasonic signals to reach the mobile robot and a preset distance value between the plurality of ultrasonic signals oscillating units,

wherein when the ultrasonic signals are received by two or more ultrasonic reception unit, the microcomputer calculates reaching time taken for each ultrasonic signal to be received by the two or more ultrasonic signal reception unit; selects two ultrasonic signal reception unit which have received ultrasonic signals whose reaching time is the fastest, among the calculated reaching time values; and calculates a distance between the mobile robot and the charging station based on the reaching time of the ultrasonic signals which have been received by the two selected ultrasonic signal reception unit.